

CLAIMS

What is claimed is:

1. A method for diagnosing faults in a system under test (SUT) having a plurality of components, the SUT having been tested by at least one system test, the method comprising:
 - generating a candidate diagnosis potentially responsible for a failing system test; and
 - assigning a weight to the candidate diagnosis based on a combined unviolated utilization of the candidate diagnosis by failing system tests, the weight thereby indicating a level of confidence that the candidate diagnosis is correct.
2. The method of claim 1, wherein the effect of the combined unviolated utilization of the candidate diagnosis by failing system tests on the weight of the candidate diagnosis is limited by a mathematical governor.
3. The method of claim 1, wherein the weight of the candidate diagnosis is also based on a combined utilization of the candidate diagnosis by passing system tests.
4. The method of claim 3, wherein the effect of the combined utilization of the candidate diagnosis by passing system tests on the weight of the candidate diagnosis is limited by a mathematical governor.
5. The method of claim 1, wherein the weight of the candidate diagnosis is also based on an observed variability of the results of the system tests.

2 6. The method of claim 5, wherein the observed variability of the results
of the system tests is defined by an observed variability of a pass-fail conflicted
shared function.

2 7. The method of claim 6, wherein the observed variability of the pass-
fail conflicted shared function is quantified by the number of passing system tests
employing the pass-fail conflicted shared function.

2 8. The method of claim 7, wherein the effect of the number of passing
system tests employing the pass-fail conflicted shared function on the weight of the
candidate diagnosis is limited by a mathematical governor.

2 9. The method of claim 6, wherein the observed variability of the pass-
fail conflicted shared function is quantified by the number of failing system tests
employing the pass-fail conflicted shared function.

2 10. The method of claim 9, wherein the effect of the number of failing
system tests employing the pass-fail conflicted shared function on the weight of the
candidate diagnosis is limited by a mathematical governor.

2 11. The method of claim 6, wherein the observed variability of the pass-
fail conflicted shared function is quantified by the utilization of structural elements by
the pass-fail conflicted shared function.

2 12. The method of claim 11, wherein the effect of the utilization of
structural elements by the pass-fail conflicted shared function on the weight of the
candidate diagnosis is limited by a mathematical governor.

13. The method of claim 1, wherein the weight of the candidate diagnosis
2 is also based on a utilization outside of a hitting set of subcomponents of at least one
of the components of the candidate diagnosis by the at least one system test.

14. The method of claim 13, wherein only the utilization of the
2 subcomponents by passing system tests is considered.

15. The method of claim 14, wherein the effect of the utilization of the
2 subcomponents of at least one of the components of the candidate diagnosis by
passing system tests on the weight of the candidate diagnosis is limited by a
4 mathematical governor.

16. The method of claim 15, wherein only the utilization of the
2 subcomponents by failing system tests is considered.

17. The method of claim 16, wherein the effect of the utilization of the
2 subcomponents of at least one of the components of the candidate diagnosis by failing
system tests on the weight of the candidate diagnosis is limited by a mathematical
4 governor.

18. The method of claim 1, wherein the weight of the candidate diagnosis
2 is also based on the replacement cost of the components of the candidate diagnosis.

19. The method of claim 18, wherein the effect of the replacement cost of
2 the components of the candidate diagnosis on the weight of the candidate diagnosis is
limited by a mathematical governor.

20. The method of claim 1, wherein the weight of the candidate diagnosis
2 is also based on the failure rate of the components of the candidate diagnosis.

21. The method of claim 20, wherein the effect of the failure rate of the
2 components of the candidate diagnosis on the weight of the candidate diagnosis is
limited by a mathematical governor.

22. A method for diagnosing faults in a system under test (SUT) having a
plurality of components, the SUT having been tested by at least one system test, the
4 method comprising:

generating a candidate diagnosis potentially responsible for a failing system
6 test; and

assigning a weight to the candidate diagnosis based on a combined utilization
8 of the candidate diagnosis by passing system tests, the weight thereby indicating a
level of confidence that the candidate diagnosis is correct.

23. The method of claim 22, wherein the effect of the combined utilization
2 of the candidate diagnosis across passing system tests on the weight of the candidate
diagnosis is limited by a mathematical governor.

24. The method of claim 22, wherein the weight of the candidate diagnosis
2 is also based on an observed variability of the results of the system tests.

25. The method of claim 24, wherein the observed variability of the results
2 of the system tests is defined by an observed variability of a pass-fail conflicted
shared function.

26. The method of claim 25, wherein the observed variability of the pass-
2 fail conflicted shared function is quantified by the number of passing system tests
employing the pass-fail conflicted shared function.

27. The method of claim 26, wherein the effect of the number of passing
2 system tests employing the pass-fail conflicted shared function on the weight of the
candidate diagnosis is limited by a mathematical governor.

28. The method of claim 27, wherein the observed variability of the pass-
2 fail conflicted shared function is quantified by the number of failing system tests
employing the pass-fail conflicted shared function.

29. The method of claim 28, wherein the effect of the number of failing
2 system tests employing the pass-fail conflicted shared function on the weight of the
candidate diagnosis is limited by a mathematical governor.

30. The method of claim 25, wherein the observed variability of the pass-
2 fail conflicted shared function is quantified by the utilization of structural elements by
the pass-fail conflicted shared function.

31. The method of claim 30, wherein the effect of the utilization of
structural elements by the pass-fail conflicted shared function on the weight of the
candidate diagnosis is limited by a mathematical governor.

32. The method of claim 22, wherein the weight of the candidate diagnosis
2 is also based on a utilization outside of a hitting set of subcomponents of at least one
of the components of the candidate diagnosis by the at least one system test.

33. The method of claim 32, wherein only the utilization of the
2 subcomponents by passing system tests is considered.

34. The method of claim 33, wherein the effect of the utilization of the
2 subcomponents of at least one of the components of the candidate diagnosis by

passing system tests on the weight of the candidate diagnosis is limited by a
4 mathematical governor.

35. The method of claim 32, wherein only the utilization of the
2 subcomponents by failing system tests is considered.

36. The method of claim 35, wherein the effect of the utilization of the
2 subcomponents of at least one of the components of the candidate diagnosis by failing
system tests on the weight of the candidate diagnosis is limited by a mathematical
4 governor.

37. The method of claim 22, wherein the weight of the candidate diagnosis
2 is also based on the replacement cost of the components of the candidate diagnosis.

38. The method of claim 37, wherein the effect of the replacement cost of
2 the components of the candidate diagnosis on the weight of the candidate diagnosis is
limited by a mathematical governor.

39. The method of claim 22, wherein the weight of the candidate diagnosis
2 is also based on the failure rate of the components of the candidate diagnosis.

40. The method of claim 39, wherein the effect of the failure rate of the
2 components of the candidate diagnosis on the weight of the candidate diagnosis is
limited by a mathematical governor.

41. A method for diagnosing faults in a system under test (SUT) having a
2 plurality of components, the SUT having been tested by at least one system test, the
method comprising:

4 generating a candidate diagnosis potentially responsible for a failing system
test; and
6 assigning a weight to the candidate diagnosis based on an observed variability
of the results of the system tests, the weight thereby indicating a level of confidence
8 that the candidate diagnosis is correct.

42. The method of claim 41, wherein the observed variability of the results
2 of the system tests is defined by an observed variability of a pass-fail conflicted
shared function.

43. The method of claim 42, wherein the observed variability of the pass-
2 fail conflicted shared function is quantified by the number of passing system tests
employing the pass-fail conflicted shared function.

44. The method of claim 43, wherein the effect of the number of passing
2 system tests employing the pass-fail conflicted shared function on the weight of the
candidate diagnosis is limited by a mathematical governor.

45. The method of claim 42, wherein the observed variability of the pass-
2 fail conflicted shared function is quantified by the number of failing system tests
employing the pass-fail conflicted shared function.

46. The method of claim 45, wherein the effect of the number of failing
2 system tests employing the pass-fail conflicted shared function on the weight of the
candidate diagnosis is limited by a mathematical governor.

47. The method of claim 42, wherein the observed variability of the pass-
2 fail conflicted shared function is quantified by the utilization of structural elements by
the pass-fail conflicted shared function.

2 48. The method of claim 47, wherein the effect of the utilization of structural elements by the pass-fail conflicted shared function on the weight of the candidate diagnosis is limited by a mathematical governor.

2 49. The method of claim 41, wherein the weight of the candidate diagnosis is also based on a utilization outside of a hitting set of subcomponents of at least one of the components of the candidate diagnosis by the at least one system test.

2 50. The method of claim 49, wherein only the utilization of the subcomponents by passing system tests is considered.

2 51. The method of claim 50, wherein the effect of the utilization of the subcomponents of at least one of the components of the candidate diagnosis by passing system tests on the weight of the candidate diagnosis is limited by a mathematical governor.

2 52. The method of claim 49, wherein only the utilization of the subcomponents by failing system tests is considered.

2 53. The method of claim 52, wherein the effect of the utilization of the subcomponents of at least one of the components of the candidate diagnosis by failing system tests on the weight of the candidate diagnosis is limited by a mathematical governor.

2 54. The method of claim 41, wherein the weight of the candidate diagnosis is also based on the replacement cost of the components of the candidate diagnosis.

2 55. The method of claim 54, wherein the effect of the replacement cost of
the components of the candidate diagnosis on the weight of the candidate diagnosis is
limited by a mathematical governor.

2 56. The method of claim 41, wherein the weight of the candidate diagnosis
is also based on the failure rate of the components of the candidate diagnosis.

2 57. The method of claim 56, wherein the effect of the failure rate of the
components of the candidate diagnosis on the weight of the candidate diagnosis is
limited by a mathematical governor.

2 58. A method for diagnosing faults in a system under test (SUT) having a
plurality of components, the SUT having been tested by at least one system test, the
4 method comprising:
generating a candidate diagnosis potentially responsible for a failing system
6 test; and
assigning a weight to the candidate diagnosis based on a utilization outside of
8 a hitting set of subcomponents of at least one of the components of the candidate
diagnosis by the at least one system test, the weight thereby indicating a level of
10 confidence that the candidate diagnosis is correct.

2 59. The method of claim 58, wherein only the utilization of the
subcomponents by passing system tests is considered.

2 60. The method of claim 59, wherein the effect of the utilization of the
subcomponents of at least one of the components of the candidate diagnosis by
passing system tests on the weight of the candidate diagnosis is limited by a
4 mathematical governor.

2 61. The method of claim 58, wherein only the utilization of the
subcomponents by failing system tests is considered.

2 62. The method of claim 61, wherein the effect of the utilization of the
subcomponents of at least one of the components of the candidate diagnosis by failing
system tests on the weight of the candidate diagnosis is limited by a mathematical
4 governor.

2 63. The method of claim 58, wherein the weight of the candidate diagnosis
is also based on the replacement cost of the components of the candidate diagnosis.

2 64. The method of claim 63, wherein the effect of the replacement cost of
the components of the candidate diagnosis on the weight of the candidate diagnosis is
limited by a mathematical governor.

2 65. The method of claim 58, wherein the weight of the candidate diagnosis
based on the failure rate of the components of the candidate diagnosis.

2 66. The method of claim 65, wherein the effect of the failure rate of the
components of the candidate diagnosis on the weight of the candidate diagnosis is
limited by a mathematical governor.

2 67. A system for diagnosing faults in a system under test (SUT) having a
plurality of components, the SUT having been tested by at least one system test, the
4 system comprising:

 means for generating a candidate diagnosis potentially responsible for a failing
6 system test; and

means for assigning a weight to the candidate diagnosis based on a combined
8 unviolated utilization of the candidate diagnosis across failing system tests, the weight
thereby indicating a level of confidence that the candidate diagnosis is correct.

68. A system for diagnosing faults in a system under test (SUT) having a
2 plurality of components, the SUT having been tested by at least one system test, the
system comprising:

4 means for generating a candidate diagnosis potentially responsible for a failing
system test; and

6 means for assigning a weight to the candidate diagnosis based on a combined
utilization of the candidate diagnosis by passing system tests, the weight thereby
8 indicating a level of confidence that the candidate diagnosis is correct.

69. A system for diagnosing faults in a system under test (SUT) having a
2 plurality of components, the SUT having been tested by at least one system test, the
system comprising:

4 means for generating a candidate diagnosis potentially responsible for a failing
system test; and

6 means for assigning a weight to the candidate diagnosis based on an observed
variability of the results of the at least one system test, the weight thereby indicating a
8 level of confidence that the candidate diagnosis is correct.

70. A system for diagnosing faults in a system under test (SUT) having a
2 plurality of components, the SUT having been tested by at least one system test, the
system comprising:

4 means for generating a candidate diagnosis potentially responsible for a failing
system test; and

6 means for assigning a weight to the candidate diagnosis based on a utilization
outside of a hitting set of subcomponents of at least one of the components of the

8 candidate diagnosis by the at least one system test, the weight thereby indicating a
level of confidence that the candidate diagnosis is correct.

71. A program storage medium readable by a computer system,
2 embodying a program executable by the computer system to perform method steps for
diagnosing faults in a system under test (SUT) having a plurality of components, the
4 SUT having been tested by at least one system test, the method steps comprising:
generating a candidate diagnosis potentially responsible for a failing system
6 test; and
assigning a weight to the candidate diagnosis based on a combined unviolated
8 utilization of the candidate diagnosis across failing system tests, the weight thereby
indicating a level of confidence that the candidate diagnosis is correct.

72. A program storage medium readable by a computer system,
2 embodying a program executable by the computer system to perform method steps for
diagnosing faults in a system under test (SUT) having a plurality of components, the
4 SUT having been tested by at least one system test, the method steps comprising:
generating a candidate diagnosis potentially responsible for a failing system
6 test; and
assigning a weight to the candidate diagnosis based on a combined utilization
8 of the candidate diagnosis by passing system tests, the weight thereby indicating a
level of confidence that the candidate diagnosis is correct.

73. A program storage medium readable by a computer system,
2 embodying a program executable by the computer system to perform method steps for
diagnosing faults in a system under test (SUT) having a plurality of components, the
4 SUT having been tested by at least one system test, the method steps comprising:
generating a candidate diagnosis potentially responsible for a failing system
6 test; and

8 assigning a weight to the candidate diagnosis based on an observed variability
of the results of the at least one system test, the weight thereby indicating a level of
confidence that the candidate diagnosis is correct.

74. A program storage medium readable by a computer system,
2 embodying a program executable by the computer system to perform method steps for
diagnosing faults in a system under test (SUT) having a plurality of components, the
4 SUT having been tested by at least one system test, the method steps comprising:
 generating a candidate diagnosis potentially responsible for a failing system
6 test; and
 assigning a weight to the candidate diagnosis based on a utilization outside of
8 a hitting set of subcomponents of at least one of the components of the candidate
diagnosis by the at least one system test, the weight thereby indicating a level of
10 confidence that the candidate diagnosis is correct.